PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Robert R. BUCKLEY et al.   Group Art Unit: 2622

Application No.:   09/368,354   Examiner: J. Pokrzywa

Filed: August 5, 1999   Docket No.:   103044

For: METHOD AND SYSTEMS FOR UNDERCOLOR REDUCTION

DECLARATION UNDER 37 C.F.R. §1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA   22313-1450

Sir:

We, Robert R. Buckley and Randall P. Cole, hereby declare and state that:

1.   This Declaration is submitted as evidence that so much of the subject matter claimed in the above-identified application as is shown in U.S. Patent 6,031,630 to Blair et al. (Blair) was invented by us prior to May 5, 1998 which is the effective date of U.S. Patent 6,031,630 to Blair, entitled "Method and Apparatus For Undercolor Removal During Page Pipeline Processing," which was applied in the December 2, 2005 Office Action.

2.   We are the named inventors in the above-identified application.

3.   We are the inventors of the invention disclosed in an invention proposal entitled "Implementing Intelligent Black Overprint on the Raster Image Output from a Postscript RIP" which appears as Exhibit A attached to this Declaration.

4.   The copies of these pages which constitute Exhibit A are true copies of the invention proposal. The dates of signing the invention proposal have been redacted.

5.   The invention described by Exhibit A was conceived and actually reduced to practice by us in the United States prior to May 5, 1998.

6.   Exhibit A establishes that we were in possession of so much of the invention recited in claims 1-23 as is shown by U.S. Patent 6,031,630 to Blair prior to May 5, 1998 as evidenced by the entire disclosure of Exhibit A.

7.   The Office Action cites and applies U.S. Patent 6,031,630 to Blair, as teaching:

a.   "generating information that designates the overmarked pixels." This feature is disclosed in Exhibit A on page 2, paragraphs 4-6.

b.   "performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first color and the second color to be separately included in the overmarked pixels in the same raster image." This feature is shown in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

c.   "modifying image data of the overmarked pixels in the raster image to achieve undercolor reduction by reducing a value corresponding to a reduced amount of an undercolor marking material." This feature is shown in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

8.   With respect to independent claim 10, the Office Action cites and applies U.S. Patent 6,031,630 to Blair, as teaching:

a.   "an overmarked pixel designator that generates information that designates the overmarked pixels." This feature is disclosed in Exhibit A on page 2, paragraph 4.

- 2 -

b.   "a raster image processor that creates a raster image of the color image, the raster image processor provided with an overmarking function that allows both of the at least one first color and the second color to be separately included in the overmarked pixels in the same raster image." This feature is disclosed in Exhibit A on page 2, paragraphs 1 and 3, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

c.   "an image data modification unit that modifies image data of the overmarked pixels and the raster image to achieve undercolor reduction by reducing a value corresponding to a reduced amount of an underlying marking material." This feature is shown in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

9.   With respect to independent claim 23, the Office Action cites and applies U.S. Patent 6,031,630 to Blair, as teaching:

a.   "generating information that designates the overmarked pixels." This feature is disclosed in Exhibit A on page 2, paragraphs 4-6.

b.   "performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first CMY color and the black color to be separately included in the overmarked pixels in the same raster image." This feature is disclosed in Exhibit A on page 2, paragraphs 3-7 and page 1 in the first paragraph following the "brief summary or abstract of the invention" paragraph.

c.   "modifying CMY image data of the overmarked pixels in the raster image to achieve under color reduction by reducing a value corresponding

to a reduced amount of an underlying CMY marking material." This feature is disclosed in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

10. We have addressed all of the claimed features of the independent claims as allegedly shown by Blair and have demonstrated that Exhibit A supports all of the features.

11. Prior to May 5, 1998, we carried out an actual reduction to practice of our invention as claimed in claims 1-23 of the above-identified application and as described throughout Exhibit A. In this regard, page 1 clearly states "Intelligent Black has been demonstrated for text using the CImager, i.e. an in-RIP implementation. This implementation maintains a compressed temporary record of the colors successively laid down on the page, so that when black is laid down, what is going down on top of is known and can be modified, which is what intelligent black does." Page 2 of Exhibit A clearly states "attached are two figures, which show output from the Digital Majestik without and with the Intelligent Black processing described in this proposal." Included in Exhibit A is a copy of the two figures referred to at page 2, last paragraph. Page 4, lines 6 and 7 of Exhibit A clearly states "Reduced to practice."

12. We hereby declare and state that all statements made herein of our own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or imprisonment under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Date: 16 January 2006   Robert R. Buckley

-4-

Date: _____   _____

Randall P. Cole

Attachment:
    Exhibit A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

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3.   We are the inventors of the invention disclosed in an invention proposal entitled "Implementing Intelligent Black Overprint on the Raster Image Output from a Postscript RIP" which appears as Exhibit A attached to this Declaration.

4.   The copies of these pages which constitute Exhibit A are true copies of the invention proposal. The dates of signing the invention proposal have been redacted.

5.   The invention described by Exhibit A was conceived and actually reduced to practice by us in the United States prior to May 5, 1998.

6.   Exhibit A establishes that we were in possession of so much of the invention recited in claims 1-23 as is shown by U.S. Patent 6,031,630 to Blair prior to May 5, 1998 as evidenced by the entire disclosure of Exhibit A.

7.   The Office Action cites and applies U.S. Patent 6,031,630 to Blair, as teaching:

a.   "generating information that designates the overmarked pixels." This feature is disclosed in Exhibit A on page 2, paragraphs 4-6.

b.   "performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first color and the second color to be separately included in the overmarked pixels in the same raster image." This feature is shown in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

c.   "modifying image data of the overmarked pixels in the raster image to achieve undercolor reduction by reducing a value corresponding to a reduced amount of an undercolor marking material." This feature is shown in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

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c.   "an image data modification unit that modifies image data of the overmarked pixels and the raster image to achieve undercolor reduction by reducing a value corresponding to a reduced amount of an underlying marking material." This feature is shown in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first paragraph following the "brief summary or abstract of the invention" paragraph.

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b.   "performing raster image processing to create a raster image of the color image, the raster image processing including overmarking processing that allows both the at least one first CMY color and the black color to be separately included in the overmarked pixels in the same raster image." This feature is disclosed in Exhibit A on page 2, paragraphs 3-7 and page 1 in the

first paragraph following the "brief summary or abstract of the invention"

paragraph.

c. "modifying CMY image data of the overmarked pixels in the

raster image to achieve under color reduction by reducing a value corresponding

to a reduced amount of an underlying CMY marking material." This feature is

disclosed in Exhibit A on page 2, paragraphs 3-7, and page 1, in the first

paragraph following the "brief summary or abstract of the invention" paragraph.

10. We have addressed all of the claimed features of the independent claims as

allegedly shown by Blair and have demonstrated that Exhibit A supports all of the features.

11. Prior to May 5, 1998, we carried out an actual reduction to practice of our

invention as claimed in claims 1-23 of the above-identified application and as described

throughout Exhibit A. In this regard, page 1 clearly states "Intelligent Black has been

demonstrated for text using the CImager, i.e. an in-RIP implementation. This implementation

maintains a compressed temporary record of the colors successively laid down on the page, so

that when black is laid down, what is going down on top of is known and can be modified,

which is what intelligent black does." Page 2 of Exhibit A clearly states "attached are two

figures, which show output from the Digital Majestik without and with the Intelligent Black

processing described in this proposal." Included in Exhibit A is a copy of the two figures

referred to at page 2, last paragraph. Page 4, lines 6 and 7 of Exhibit A clearly states
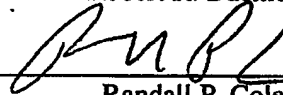
"Reduced to practice."

12. We hereby declare and state that all statements made herein of our own

knowledge are true, and that all statements made on information and belief are believed to be

true; and further that these statements were made with the knowledge that willful false

statements and the like so made are punishable by fine and/or imprisonment under Section

1001 of Title 18 of the United States Code, and that such willful false statements may

jeopardize the validity of the application or any patent issuing therefrom.

Date: _____

Date: _1/10/2005_   _____
                                Robert R. Buckley
                                 Randall P. Cole

Attachment:
       Exhibit A

EXHIBIT A

To: Xerox Intellectual Property Department

MARK COSTELLO

X Xerox Square - 20A, Rochester, NY 14644, Mail Stop XRX2-20A   ☐ El Segundo, CA 101 Continental Blvd. 90245, Mail Stop: ESC1-801

☐ Palo Alto, CA, 3333 Coyote Hill Road 94304, Mail Stop: PARC

(SEND ORIGINAL TO THE INTELLECTUAL PROPERTY DEPARTMENT AND A COPY TO YOUR MANAGER)

IP 971703

Proposal Submitted By (Please use legal name) Full First Name, Middle, Last)		Employee No.	
1 **Robert Roy Buckley** CAD		804536	
Organization (Unit/Div./Dept./Section)	Electronic Mail Address	Building No./ Mail Stop	Extension
CR&T/DITC/CADISYS/DI	**Rob Buckley@wb.xerox**	**0128-27E**	**2-1282**
Proposal Submitted By (Please use legal name) Full First Name, Middle, Last)		Employee No.	
2 **Randall Patrick Cole**		891325	
Organization (Unit/Div./Dept./Section) OPB	Electronic Mail Address	Building No./ Mail Stop	Extension
ODPG/NSSD/SDSP	**cole@sdsp.mc.xerox.com**	**820-03F**	**5-7949**
Proposal Submitted By (Please use legal name) Full First Name, Middle, Last)		Employee No.	
*3			
Organization (Unit/Div./Dept./Section)	Electronic Mail Address	Building No./ Mail Stop	Extension

* If space for additional submitters is required, please use another sheet; and attach any supplementary Comments.

Manager Norman W	Electronic Mail Address	Bldg. No./MS	Name of Xerox Program (if any)
Norm Zeck (for Buckley)	Norm Zeck@wb.xerox	0128-29E	none

Descriptive Title of Proposal   Hugo Baltinc   CS2C ·C3E

Implementing Intelligent Black Overprint on the raster image output from a PostScript RIP.

Provide a brief summary or abstract of the invention, specifically pointing out the features you think are new:

Intelligent Black Overprint has been implemented and demonstrated already within a PostScript RIP via the CImager. This invention would make the same function (and its advantages) available with a RIP that implements overprinting and from which objects are available or can be inferred.

Provide here, using added pages, a more detailed technical description of your invention, including the advantage(s), and the problem(s) solved by the invention, and how each is accomplished. Please indicate the current methods or techniques used to solve the problem(s), and the deficiencies of these methods or techniques. Sketches, drawings, notebook pages, memos, or photos can be very helpful and should be attached if possible:

Black overprint adds black (K) to the colored inks (CMY) previously laid down at the same point in the image, i.e., it prints rich black instead of a single black. This masks registration errors for black text on colored backgrounds, but can lead to transfer problems due to excessive pile height. *Intelligent* Black (IQK) overprint adds black to a _reduced amount of the colored inks (CMY)_ previously laid down. This reduces conductive mag brush effects on Majestik and DocuColor 40 and reduces transfer problems due to pile height differences. (For details, see the OOR Fact Sheet on IQK at http://www.wrc.xerox.com/~buckley/OORFactSheets.html#IQK.)

Intelligent Black has been demonstrated for text using the CImager, i.e. an in-RIP implementation. This implementation maintains a compressed, temporary record of the colors successively laid down on the page, so that when black is laid down, what it is going down on top of is known and can be modified, which is what Intelligent Black does.

Witnessed and Understood By	Date
Submitter(s) Signature(s)	Date

The RIP output is a raster image that only contains on-top or visible colors; the underlying colors are not needed anymore and have been discarded. Without knowledge of the underlying colors, there is nothing for Intelligent Black to do.

This proposal describes a way of retaining knowledge of the underlying colors in the raster image output from the RIP, and a way in which Intelligent Black can use that knowledge and work on text or graphics, for example.

The RIP imaging proceeds as usual, except that overprinting is used for black text. Overprinted black text only can be had by PostScript operator overloading. For example, consider black text (CMYK=0,0,0,1) going down on top of a red (CMYK=0,1,1,0) background. Without overprint, the result is CMYK=0,0,0,1. With overprint, the result is CMYK=0,1,1,1, so that the resulting (output) pixel contains the CMY values of the color underneath the black. The CMY values are available in the output image and can be modified, if one knows which CMY values are the result of overprinting (and candidates for modification) and which aren't (and are the result of 100% UCR applied to a picture, for example). This is where the tags come in.
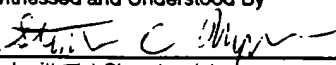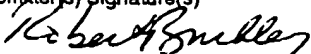
A tag is used to mark the pixels eligible for Intelligent Black processing. The tag could identify "text," except that such a tag could not tell whether CMYK=c,m,y,1 is the result of overprinting CMYK=c,m,y,0 with black or printing CMYK=c,m,y,1 directly. (It may not matter much; if CMYK=c,m,y,1 is a seldom specified text color, then black overprint can be inferred.) An "overprintedText" tag would also require assumptions or inferences. A solution is a "blackText" tag, labeling the text as black, so that non-zero CMY values are the result of overprinting.

Without tags, some form of black text recognition would be needed.

For the pixels that have been tagged for Intelligent Black processing, the CMY values would be examined and modified so that the total coverage was within specified limits. The modified image would then be printed.

Taken together, this proposal describes an Intelligent Black implementation as a combination of overprinting in the RIP and tag-based coverage reduction after the RIP. The steps in the process are: use overprint if black text (in the RIP) and modify tagged CMY values (in the raster image after the RIP) wherever "blackText" tag is true or can be inferred to be true. The implementation described here does tag-based coverage reduction of areas with overprinted black text.

Attached are two figures, which show output from the Digital Majestik without and with the Intelligent Black processing described in this proposal. For this test, several color strips were printed, with text in a single color black on the right hand side and text with black overprint on the left. It was the black overprinted text on the left that was modified. In this test, a "text" tag was sufficient. Where the processing described here made the most difference was when black text was printed on green (second strip from top and strip at bottom.) We expect that the effectiveness of this processing will vary from machine to machine, but have not tested this yet.

Name of others known to have worked on this or a similar invention:

Dave Rumph, Dale Green, Victor Klassen, Steve Harrington, Stephen Morgana

Identify any known similar, or related invention Proposals, patents or publications, Xerox or non-Xerox commercial products, or indicate none:

Object-Optimized Printing System - patent application D/94241
Image Processing Method to reduce marking material coverage in printing process - US Patents 5 649 071, 5 636 967, 5 563 985, 5 519 815, 5 515 479 (assigned to Xerox)

Has a model, a prototype, or experiment of the invention been built, made, run or tested ?   X Yes   ☐ No

Is the invention used in a current product(s) or planned for use in a future product(s) ?   ☐ Yes   x No
If so, please identify the program(s) or product(s), and introduction dates:

Indicate the date(s) of any previous or planned future disclosure external to Xerox, (has the invention been disclosed, or is it planned for disclosure outside of Xerox) and identify the type of disclosure (by agreement, demonstration, paper or presentation given, market probe, published article, etc., and if convenient, please provide a copy of the agreement, paper or article):

None planned at this time.

Source of outside funding, if any:
**None**

Witnessed and Understood By	Date
Submitter(s) Signature(s)	Date

TAP 020, SOFTWARE & IMAGE PROCESSING, Thursday, ████████████
Panel Members: Marty Banton, Dave Birnbaum, Reiner Eschbach, Bob Loce, and Michael Shahin, Chairman. Nick Nickerson (Observer).

Page 4

IP No.	Date	Attorney	Panel	Author(s)	Title	Rating	System
971703	████	M-C	020	Robert R. Buckley Randall P. Cole	IMPLEMENTING INTELLIGENT BLACK OVERPRINT ON THE RASTER IMAGE OUTPUT FROM A POSTSCRIPT RIP	3	YES

IP/971703 proposes an image decomposition method that performs "intelligent black" within any decomposer that allows overprinting and possibly a tag for text. "Intelligent black", a black overprint with reduced amount of other colorants, implemented previously only within a Xerox DFE, where a high degree of control in the RIPing process was possible is here extended to other RIP's by employing an overprint option to achieve K and other colors at the same location, then downstream, detecting the pixels where the overprinting occurred and modifying colorant levels at those pixels. Reduced to practice. Specific requirement of the Business Division. Attorney, please check for relaxed art in a recent patent assigned to D. Birnbaum, B. Smith, R. Chan and F. Ebner. Reduces toner pile height and avoids transfer problems. Rating: 3.
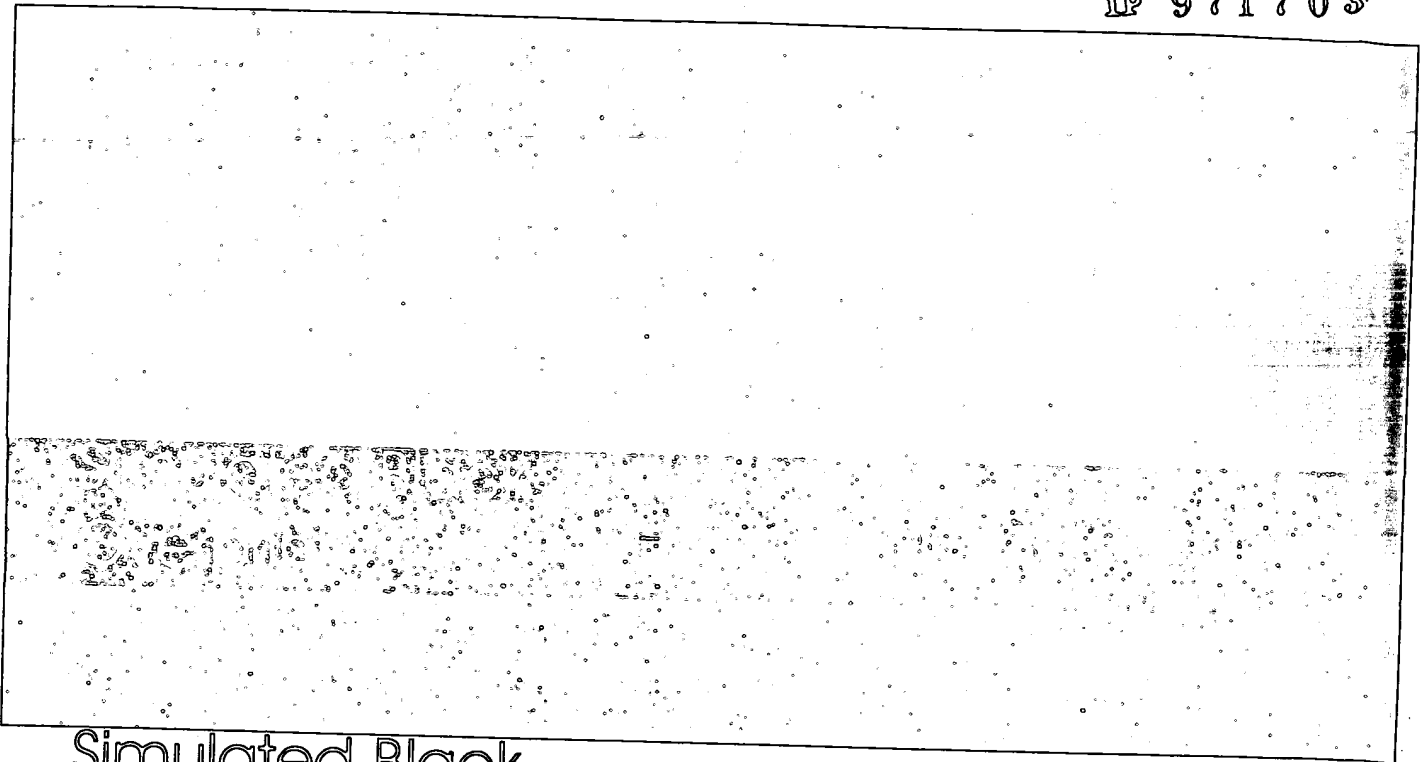
Simulated Black
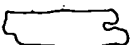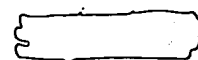Overprint

One Color Black

I Q K
scepter

Robert Bradley